

AMENDMENTS TO THE CLAIMS

(IN FORMAT COMPLIANT WITH THE REVISED 37 CFR 1.121)

1-2. (CANCELED).

3. (PREVIOUSLY PRESENTED) A method of recording data on a recording medium comprising:

dividing the data into N-bit segments, where N is an integer greater than 1;

5 mapping the data to a set of write symbols comprising  $2^N$  distinct write symbols, wherein each write symbol represents a possible N-bit segment of the data and wherein the set of write symbols is defined by:

defining a set of variable write parameters;

10 generating a plurality of candidate write symbols that specify different values for the variable write parameters;

generating a plurality of analog readout waveforms produced by the plurality of candidate write symbols;

15 analyzing the analog readout waveforms to determine a set of distinguishable readout waveforms; and

selecting selected ones of the plurality of candidate write symbols that correspond to the distinguishable readout waveforms to be included in the set of write symbols; and

1 writing the data to the medium using the set of write symbols.  
20

4. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the medium is an optical disc.

5. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the medium is a phase change optical disc.

6. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the set of variable write parameters defines characteristics of a sequence of laser pulses.

7. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the set of variable write parameters defines the timing of a sequence of laser pulses.

8. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the medium includes inserting guard bands between the write symbols on a track.

9. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the medium includes inserting guard bands between the write symbols on a track, wherein the guard bands are appropriately sized to avoid intersymbol interference.

10. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the medium includes inserting guard bands between the write symbols on a track, wherein the guard bands are appropriately sized to avoid thermal crosstalk.

11. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 further comprising using matched filter detection to recover the data.

12. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein a cross correlation coefficient is calculated to recover the data.

13. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein a combination of a cross correlation coefficient and comparison of a DC level is used to recover the data.

14-15. (CANCELED).

16. (PREVIOUSLY PRESENTED) A method of recording data on a recording medium comprising:

dividing the data into N-bit segments, where N is an integer greater than 1;

mapping the data to a set of write symbols comprising  $2^N$  distinct write symbols, wherein each write symbol represents a possible N-bit segment of the data and wherein the set of write symbols is defined by:

5           defining a set of variable write parameters;  
            generating a plurality of candidate write symbols that specify different values for the variable write parameters;  
            generating a plurality of readout waveforms in response to marks produced by the plurality of candidate write symbols;  
10           analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium; and  
            selecting selected ones of the plurality of candidate write symbols that correspond to the readout waveforms that match  
15           the read/write channel that includes the recording medium to be included in the set of write symbols; and  
            writing the data to the medium using the set of write symbols

17. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using a genetic algorithm to generate the  
1:  
5           plurality of candidate write symbols.

18. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes randomly generating the plurality of candidate write symbols.

19. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate the plurality of candidate write symbols.

20. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate an initial set of candidate write symbols and using a genetic algorithm to refine the initial set of candidate write symbols.

21. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to represent individual channel bits.

22. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to represent individual channel bits and shifting and adding combinations of the waveforms.

23. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to represent individual channel bits wherein a spectrum of the pair of waveforms becomes band-limited and resembles a spectrum of a signal-to-noise ratio  $SNR(f)$  of the read/write channel.

24. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium includes determining ideal readout waveforms that follow the read/write channel SNR spectrum.

25. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the medium is an optical disc.

26. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the medium is a phase change optical disc.

27. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the set of variable write parameters defines characteristics of a sequence of laser pulses.

28. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the set of variable write parameters defines the timing of a sequence of laser pulses.

29. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein a Viterbi detector is used to recover the data.

30. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 11 wherein the matched filter detection comprises comparing analog readout waveforms obtained from individual segments to waveforms in pre-stored tables using  
5 predetermined pattern recognition techniques.

31. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 11 wherein the matched filter detection comprises:

sampling an analog readout waveform signal;

5           normalizing an amplitude of the sampled signal; and  
separating the sampled signal into segments.

32. (PREVIOUSLY PRESENTED) A method of recording data on  
a medium as recited in claim 31 wherein the matched filter  
detection further comprises:

calculating a cross-correlation coefficient between the  
5 segments and patterns in a look-up table; and

comparing a DC level of the segments with the patterns in  
the look-up table.

33. (PREVIOUSLY PRESENTED) A method of recording data on  
a medium as recited in claim 3 wherein the variable write  
parameters comprise one or more of a height of a laser pulse, a  
duration of a laser pulse, a width of a cooling pulse following a  
5 heating pulse, an interval between adjacent laser pulses, and a  
power level of a laser pulse.

Please add the following new claims:

34. (NEW) A method of recording data on a medium as  
recited in claim 3 wherein the analog readout waveforms are  
generated by recorded amorphous/crystalline patterns and read from  
an optical disc.



35. (NEW) A method of recording data on a medium as recited in claim 16 wherein the readout waveforms comprise analog waveforms read from an optical disc and the marks comprise recorded amorphous/crystalline patterns.